INK-JET RECORDING APPARATUS

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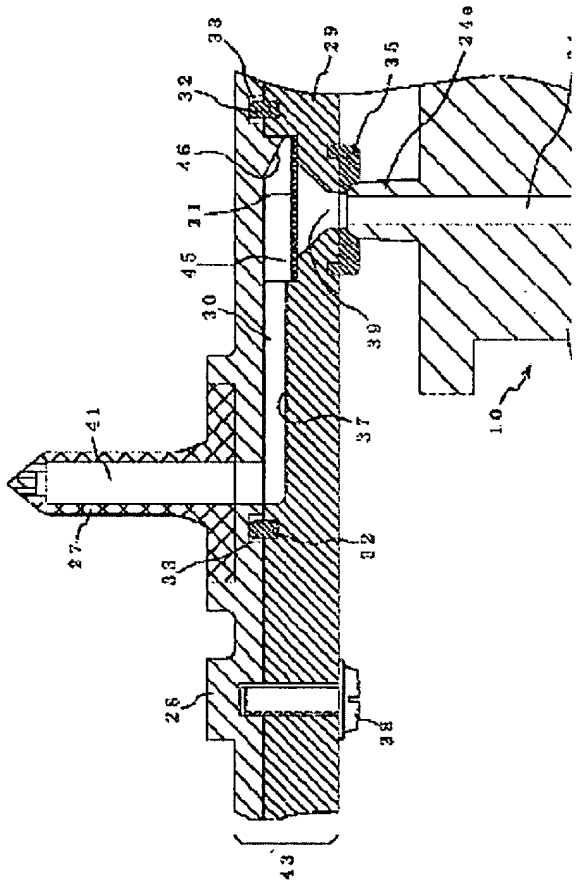
Abstract of **JP2002337362**

PROBLEM TO BE SOLVED: To provide an ink-jet recording apparatus comprising a channel connection structure capable of improving the reliability and the productivity. SOLUTION: This apparatus comprises a head main body 10 for ejecting ink droplets, and a channel constituent plate 43 having a channel 30 formed for guiding an ink of an ink cartridge to the head main body 10, wherein the channel constituent plate 43 is provided by laminating a lower side channel plate 29 having a recess part to serve as the ink channel 30 formed on at least one side and an upper side channel plate 28 via an elastic sealing member 32 surrounding the channel 30.



* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The ink-jet formula recording device which equipped the aforementioned recording head with the passage composition board which forms the ink passage to which ink is led from the recording head which carries out the regurgitation of the ink drop characterized by providing the following, the ink cartridge which supplies ink to the aforementioned recording head, and the aforementioned ink cartridge The 1st passage board equipped with the connection material which a passage composition board connects with the aforementioned ink cartridge The end connection linked to the aforementioned recording head, and the crevice in which a filter is held
[Claim 2] The ink-jet formula recording device according to claim 1 in which the lobe which engages with the inner skin of the crevice which holds the aforementioned filter in the 1st passage board is formed.
[Claim 3] the aforementioned elastic seal member -- the [the 1st passage board or] -- the ink-jet formula recording device according to claim 1 which has fixed by two color molding or outsert fabrication to 2 passage board
[Claim 4] an elastic seal member -- the [the 1st passage board or] -- the ink-jet formula recording device according to claim 1 currently fixed in 2 passage board by fabrication in one
[Claim 5] The ink-jet formula recording device according to claim 1 to which the aforementioned filter is being fixed so that the field of the upstream of the aforementioned filter may be exposed where the 1st passage board and the 2nd passage board are disassembled.
[Claim 6] The ink-jet formula recording device according to claim 1 to 5 by which the aforementioned ink cartridge and the 1st free passage way open for free passage are formed in the 1st passage board, and the 2nd free passage way open for free passage is formed in the 2nd passage board with the aforementioned recording head again.
[Claim 7] The ink-jet formula recording device according to claim 1 by which the aforementioned recording head and the passage composition board are connected to either the aforementioned recording head or the aforementioned passage composition board through the packing member which fixed beforehand.
[Claim 8] The ink-jet formula recording device according to claim 7 by which the aforementioned packing member is fixed in the passage composition board or the recording head by one by two color molding or outsert fabrication.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the structure of the ink-jet formula recording device equipped with the recording head which makes an ink drop the ink supplied from the ink cartridge, and carries out the regurgitation, and the ink passage which supplies ink from an ink cartridge at a recording head main part more at a detail.
[0002]
[Description of the Prior Art] The ink-jet formula recording device is equipped with the ink-jet recording head which makes ink an ink drop and carries out the regurgitation, and the ink cartridge which stores the ink supplied to this recording head. The ink supply needle which connects a recording head and an ink cartridge and forms ink passage is formed in a head electrode holder, and the ink feed hopper is prepared in the ink cartridge.
[0003] That is, as shown in drawing 9 which shows a state just before the ink supply needle 53 is equipped with an ink cartridge 52, the cartridge case 62 which the recording head 51 which carries out the regurgitation of the ink drop corresponding to a printing signal is attached in the inferior surface of tongue of the head electrode holder 50, and holds an ink cartridge 52 in the upper surface of the head electrode holder 50 is formed. On the other hand, an ink cartridge 52 equips the inferior surface of tongue with the positioning projected part 63, and the ink feed hopper 54 is formed in the inferior surface of tongue of the positioning projected part 63. In addition, opening of the ink feed hopper 54 is closed with the film 64 which can be fractured with an ink supply needle at the time of wearing.
[0004] On the other hand, the crevice 61 in which the positioning projected part 63 is held is formed in the upper surface of the head electrode holder 50, and the ink supply needle 53 is set up by this crevice 61. In addition, this example shows the recording device printed using the ink of four colors, and a total of four ink supply needles 53 is prepared for every color.
[0005] The point of the ink supply needle 53 is formed in the shape of a cone so that the film 64 of the ink feed hopper 54 can be broken through easily, as shown in drawing 10 . and the ink guidance penetrated in the vertical direction to the cone-like side 58 at a nose of cam -- the hole 56 is drilled and -- the interior of the ink supply needle 53 -- ink guidance -- the 1st ink passage 55 which is open for free passage to a hole 56 is formed, and the 2nd ink passage 67 which leads the ink guided in the 1st ink passage 55 of the ink supply needle 53 to a recording head 51 is formed in the head electrode holder 50
[0006] The filter 59 which filters the ink supplied from the ink cartridge 52 is formed in the entrance portion of the 2nd ink passage 67. In order to lead ink to the recording head 51 with a width-of-face size smaller than an ink cartridge 52, the 2nd ink passage 67 is formed so that it may be aslant prolonged in a horizontal direction and the vertical direction toward the central head main part 51.
[0007] if it equips with an ink cartridge 52, the nose of cam of the ink supply needle 53 will break through the film 64 of the ink feed hopper 54 of an ink cartridge 52, and the ink supply needle 53 will insert in in the ink feed hopper 54 -- having -- ink guidance of the ink supply needle 53 -- the [a hole 56, the 1st, and] -- the ink in an ink cartridge 52 flows into a recording head 51 through 2 ink passage 55

and 67
[0008]
[Problem(s) to be Solved by the Invention] However, in the aforementioned recording head, in order to lead ink to the head main part 51 with a size smaller than an ink cartridge 52, it is formed so that passage 67 may be aslant prolonged toward the head main part 51. Thus, the slanting hole which needs complicated processing for a recording head must be made to form, and a cost rise is not avoided. Moreover, since passage 67 is made to form aslant, there is a problem of checking thin shape-ization of a recording device.
[0009] While the passage formation board 69 is formed in the inferior surface of tongue of the head electrode holder 50 as shown in drawing 11 and the 1st ink passage 55 and the 2nd ink passage 57 open for free passage are formed in this passage formation board 69 in order to solve such a problem for example, the slot 68 which is open for free passage to the 2nd ink passage 57 is formed. And it is possible to join a plate 66 by adhesives or ultrasonic welding, and to form passage 67 in the open section side of a slot 68. In addition, the sign 70 in drawing shows the ink feed holes which supply ink to the recording head which is not illustrated. According to this, the passage which leads ink to a recording head with narrow width of face from the latus ink cartridge of width of face can be formed only by installing passage horizontally at least, and it becomes possible to stop the size of the height direction.
[0010] However, when adhesives are used for junction on the passage formation board 69 and a plate 66, it separates by vibration which the foam which a foam tended to adhere and adhered to the adhesives protruded in passage 67 is printing, and flows into a recording head from passage 67, and there is a problem of causing poor printing. Moreover, in junction by ultrasonic welding, **** of a melting resin when [required] making the passage formation board 69 and a plate 66 reciprocate at high speed relatively tends to remain, and there is a problem of invading in the recording head passage 67 and causing poor printing too. Furthermore, since the once joined joint cannot be removed in junction by adhesives or ultrasonic welding, the work of washing the inside of passage 67 and filter 59 grade, and reproducing is next to impossible.
[0011] The place which this invention was made in view of such a situation, and is made into the purpose has productive efficiency and a good yield, and it is offering the ink-jet formula recording device which could prevent generating of a printing trouble as much as possible, and was equipped with passage connection structure with an easy maintenance.
[0012]
[Means for Solving the Problem] In order to attain such a technical problem the ink-jet formula recording device of this invention The recording head which carries out the regurgitation of the ink drop, and the ink cartridge which supplies ink to the aforementioned recording head, In the ink-jet formula recording device equipped with the passage composition board which forms the ink passage which leads ink to the aforementioned recording head from the aforementioned ink cartridge The 1st passage board equipped with the connection material which a passage composition board connects with the aforementioned ink cartridge, Carry out the laminating of the 2nd passage board equipped with the end connection linked to the aforementioned recording head, and the crevice in which a filter is held, and it is constituted possible [attachment and detachment]. The elastic seal member which the slot which forms the aforementioned ink passage is formed in the front face of one [at least] aforementioned passage board, and surrounds the aforementioned slot is prepared in one aforementioned passage board, and the seal groove which holds the aforementioned elastic seal member in the state of suppression is formed in the aforementioned passage board of another side.
[0013]
[Function] Since adhesion and welding work become unnecessary, it can wipe away completely un-arranging, such as blinding by overflowing adhesives and the overflowing welding slag, and a filter is located in the recording head side of ink passage, the dust which trespassed upon ink passage by assembly operation etc. is certainly removed by the filter. Since an elastic seal member is formed and the laminating of the attachment and detachment is made possible to the slot which forms passage in the front face of a passage board so that this may be surrounded, the ink passage which leads ink to the

aforementioned recording head can be constituted from an ink cartridge as the planar structure, and a miniaturization becomes easy. Moreover, it becomes maintainable by decomposition.
[0014]
[The mode of implementation of invention] Then, based on the example illustrating the detail of this invention, it explains below. Drawing 1 and drawing 2 are drawings showing an example of the circumference structure of an ink-jet formula recording device where the passage connection structure of this invention is applied. This equipment is equipped with the carriage 3 with which the recording head 1 was attached while an ink cartridge 2 is carried.
[0015] The guide hole 26 (drawing 2) is guided at a guide bar 6, by connecting carriage 3 to a stepping motor 5 through a timing belt 4, both-way movement is carried out, a recording head 1 is attached in the direction of paper width of the recording paper 7 (main scanning direction) in the recording paper 7, the field which counters, and this example on the undersurface, and as shown in drawing 2 , the hold field of an ink cartridge 2 is formed in the upper surface, and the covering device material 25 which presses down the upper part of an ink cartridge 2 to moreover, the cap 8 who prevents dryness of nozzle opening by closing nozzle opening of a recording head 1 during a printing pause in a non-printing area and the wiper which carries out wiping of the nozzle side of a recording head 1 -- the member 9 is arranged
[0016] Drawing 3 shows one example of the recording head main part 10, joins the nozzle opening 11, the passage unit 13 in which the pressure generating room 12 was formed, and the head case 15 where the piezoelectric transducer 14 was held, and is constituted. The laminating of the passage formation board 19 with which the space corresponding to the nozzle plate 16 in which the nozzle opening 11 was drilled, and the pressure generating room 12, the common ink room 17 and the ink supply way 18 that makes these open for free passage was formed, and the diaphragm 20 which closes the effective area of the pressure generating room 12 is carried out, and the passage unit 13 is formed.
[0017] After the piezoelectric transducer 14 has fixed by the input of a driving signal to island section 20A of a diaphragm 20 which contracts to a longitudinal direction in the state of charge, and is elongated to a longitudinal direction in the process which discharges from a charge state and in which it is the so-called vibrator in longitudinal-oscillation mode, and the nose of cam forms a part of pressure generating room 12, the other end is being fixed to the pedestal 21.
[0018] Moreover, the damper room 23 wide opened by the atmosphere through the air free passage way 42 is formed in the field corresponding to the common ink room 17, and it is constituted by the head case 15 so that the pressure fluctuation in the ink room 17 may be eased by the elastic deformation of a diaphragm 20.
[0019] Thus, the constituted recording head main part 10 is ** which receives contraction and extension of a piezoelectric transducer 14, and the pressure generating room 12 expands and contracts and is breathed out from the nozzle opening 11 by the pressure fluctuation of the pressure generating room 12 by this by making suction of the ink from the ink cartridge to the pressure generating room 12, and the ink of the pressure generating room 12 into an ink drop. In addition, a sign 34 shows the flexible cable with which a sign 22 inputs the circuit board into the head main part 10 for a driving signal etc. from the circuit board 34 again, respectively.
[0020] Drawing 4 and drawing 5 are what shows one example of the passage composition board which forms the ink passage which supplies ink to the recording head main part 10 from the ink supply needle 27. The top passage board 28 in which six ink supply needles 27 which function as connection material connected with an ink cartridge 2 in this example were implanted (the 1st passage board), The bottom passage board (the 2nd passage board) 29 with which the passage 30 which is open for free passage to each ink supply needle 27, and is prolonged in parallel with the field of a passage board was formed is piled up, and a screw 38 is inserted in a hole 40, and it fixes to one and is constituted.
[0021] as shown in drawing 6 (a) and (b), the passage slot 37 prolonged in the ink supply hole 39 from the ink supply needle 27 is engraved on the upper surface of the bottom passage board 29, the narrow slot 44 is formed in it so that the periphery of the passage slot 37 may be surrounded, and it is shown in drawing 7 (a) and (b) -- as -- this slot 44 -- an elastic endless-like seal -- it has loaded and the member 32 has fixed The recording head 10 side of the passage slot 37 is equipped with the filter 31 which filters

the ink which the cone-like crevice 45 is formed and flowed down passage 30 here. on the other hand -- the undersurface of the top passage board 28 -- an elastic seal -- the seal groove 33 held oppressing a member 32 -- an elastic seal -- it is formed so that it may correspond to a member 32, and the lobe 46 equipped with the peripheral face which engages with the inner skin of a crevice 45 is formed in the position corresponding to a crevice 45

[0022] By this, if the lobe 46 of the top passage board 28 is made to engage with the crevice 45 of the bottom passage board 29 Since a laminating is carried out after the bottom passage board 29 and the top passage board 28 have been positioned by the position, if it fixes with a screw 38 each passage slot 37 -- an elastic seal -- where a member 32 is infixed, it is airtightly closed with the top passage board 28, and in parallel and this example, it becomes the passage composition board 43 equipped with the passage 30 prolonged horizontally in the field of the passage boards 29 and 28

[0023] thus, the passage slot 37 where passage 30 was formed in the bottom passage board 29 and an elastic seal -- since it is formed from the member 32, an adhesion process becomes unnecessary and the passage composition board 43 can be manufactured by the easy work of fixing the plate of two sheets with a screw etc.

[0024] thus, the slot which was formed so that the constituted passage composition board 43 might surround the ink supply hole 39 at the bottom and which is not illustrated -- packing -- the passage for supplying ink to the recording head main part 10 from the ink supply needle 27 is completed by fitting in a member 35 and making heights 24a of the ink supply pipe 24 formed in the head case 15 of a recording head 10 ****

[0025] in addition, an elastic seal -- a member 32 and packing -- although a member 35 may attach what was formed with another object in the bottom passage board 29 -- the bottom passage substrate 29 and an elastic seal -- a member 32 and packing -- if a member 35 is formed in one by two color molding and outsert fabrication -- an elastic seal -- a member 32 and packing -- installation and positioning of a member 35 etc. become unnecessary and workability and productive efficiency improve not only it but an elastic seal -- a member 32 and packing -- since the member 35 has fixed beforehand to the lower passage board 29, improvement in the reliability of a seal can be aimed at furthermore, an elastic seal -- a member 32 and packing -- simplification of a manufacturing process can be attained that what is necessary is to give two color molding and outsert fabrication only to one substrate 29 by forming both the members 35 only in the lower passage board 29 side

[0026] Thus, in the constituted recording device, if the screw 38 of the passage composition board 43 is removed where the recording head main part 10 is removed when a foreign matter etc. mixes in the passage from the ink supply needle 27 to the recording head main part 10 and poor printing arises, the top passage board 28 and the bottom passage board 29 will dissociate. Since the upper surface of the filter 31 with which the foreign matter is caught is exposed by this, a foreign matter can be easily removed from a filter 31, the passage decomposed further can be washed easily, and poor printing of a recording head 1 can be canceled simply and certainly.

[0027] Moreover, since the ink passage 41 which makes the top passage board 28 open an ink cartridge 2 and passage 30 for free passage is formed in a recording device and the ink supply hole 39 which makes the bottom passage board 29 open the recording head main part 10 and passage 30 for free passage is formed, Even if it is equipment which can take about passage 30 superficially from the ink supply needle 27 in the position distant from the recording head main part 10, can lead ink to the recording head main part 10, and is printed using the ink of two or more colors Ink can be supplied to a recording head from a large-sized ink cartridge, without needing the ink passage arranged in three dimensions.

[0028] Since passage 30 is formed in parallel with the passage formation board 43 by this, the size of the height direction of a recording head 1 becomes small, and the miniaturization of equipment can be attained. Moreover, since a filter 31 can be arranged near the recording head side 39, i.e., an ink supply hole, even if dust etc. infiltrates into passage 30 like an erector, it can prevent certainly that a filter 31 removes and foreign matters, such as dust, infiltrate into the recording head main part 10.

[0029] packing annular to the proximal region of the ink supply pipe 24 which drawing 8 shows other

examples of this invention, and supplies ink to the head case 15 of the recording head main part 10 in this example -- a member -- 35' is fixed in one by outsert fabrication and two color molding moreover, the ink supply hole 39 of the bottom passage board 29 -- from the bottom passage board 29 -- projecting -- packing -- a member -- it is formed as annular heights 39a of the grade which can **** in 35'
[0030] according to this example -- the recording head main part 10 -- carriage -- direct and an attaching member -- minding -- fixing -- subsequently -- heights 39a of the ink supply hole 39 of the passage composition board 43 -- packing -- a member -- ink passage is connectable by aligning to 35' and fixing to carriage through direct or an attaching member
[0031] according to this example -- packing -- a member -- since 35' is beforehand fixed in the head case 15 by one -- heights 39a of the passage composition board 43 -- aligning -- packing -- a member -- it only **** to 35' and can connect certainly
[0032] In order that the passage composition board 43 may serve as the attaching member of a filter 31 according to these examples, It compares, when a filter 59 is infixed between the ink supply needles 53 and the head cases 50 as shown in drawing 9 and it fixes the ink supply needle 53 to the head case 50. Injection molding can really constitute the top passage board 28 and the ink supply needle 27 as an object, the connection process of an ink supply needle can be abolished, and curtailment of the number of erectors can be aimed at.
[0033] in addition, the gestalt of the aforementioned implementation -- setting -- an elastic seal -- a member 32 and packing -- although it cannot limit and various kinds of material, such as natural rubber and various synthetic rubber, can be used especially as a spring material which constitutes a member 35 and 35', isobutylene isoprene rubber with the good resistance over ink, silicone rubber, polypropylene, etc. are suitable, and, in two color molding or outsert fabrication, an elastomer is suitable
[0034] In addition, in an above-mentioned example, although the passage slot 37 is engraved on the bottom passage board 29 and ink passage is formed, the passage slot 37 can be engraved on the top passage board 28, and passage can also be formed. moreover, an above-mentioned example -- setting -- the front face of the bottom passage board 29 -- an elastic seal -- although the member 32 is formed -- the top passage board 28 -- an elastic seal -- the same operation is done so even if it forms the seal groove 33 which forms a member 32 and holds an elastic seal member in the bottom passage board 29
[0035] Moreover, although the form of the aforementioned implementation showed the example in which passage 30 was prolonged horizontally and the filter 31 applied this invention to the recording device located in the down-stream edge of passage 30, it is not limited to this and can also apply to the recording device to which passage 30 extended aslant, and the recording device in which a filter 31 exists in addition to the down-stream edge of passage 30. The same operation effect is done so also in these cases.
[0036] In addition, since this invention is concerned with the structure of the connection passage of an ink cartridge and a recording head, there is no involvement in the form of a recording head, that is, it is clear. [applicable to the recording head using the piezoelectric transducer in flexurally oscillating mode and the recording head using the heater element which carries out the heating evaporation of the ink]
[0037]
[Effect of the Invention] Attaining simplification for a manufacturing process, since ink passage can be formed only by enabling laminating fixation of the attachment and detachment of the plate of two sheets with a screw etc. according to the ink-jet formula recording device of this invention as explained above, moreover, since it can decompose easily by adhesives' overflowing and cursing in ink passage, and being able to prevent that welding slag mixes, and canceling junction, it becomes maintainable [passage]. Furthermore, since a filter is located in the recording head side of ink passage, fabrication etc. can constitute the connection material which the dust which trespassed upon ink passage by assembly operation etc. is not only certainly removable with a filter, but connects it with an ink cartridge in one passage board and one, and simplification of a manufacturing process can be attained.

[Translation done.]

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３３　弾性シール部材収容部
３５、３５’　パッキン部材
４３　流路構成板

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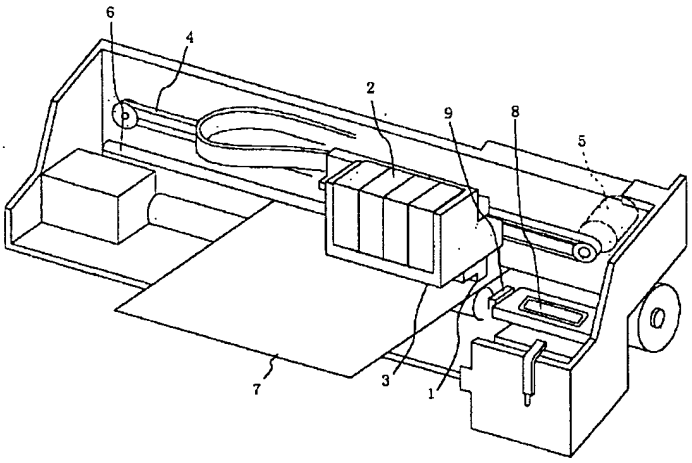
＊４４　弾性シール部材を収容する溝
４５　フィルタ室を形成する凹部
＊　４６　突出部

【図１】



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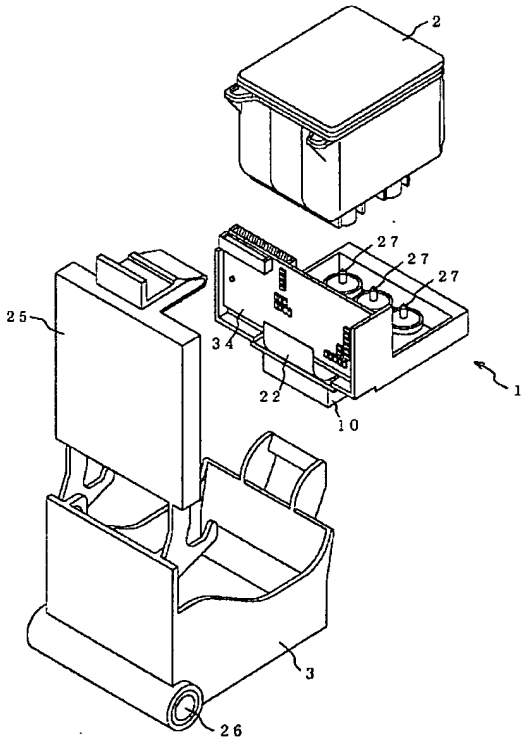

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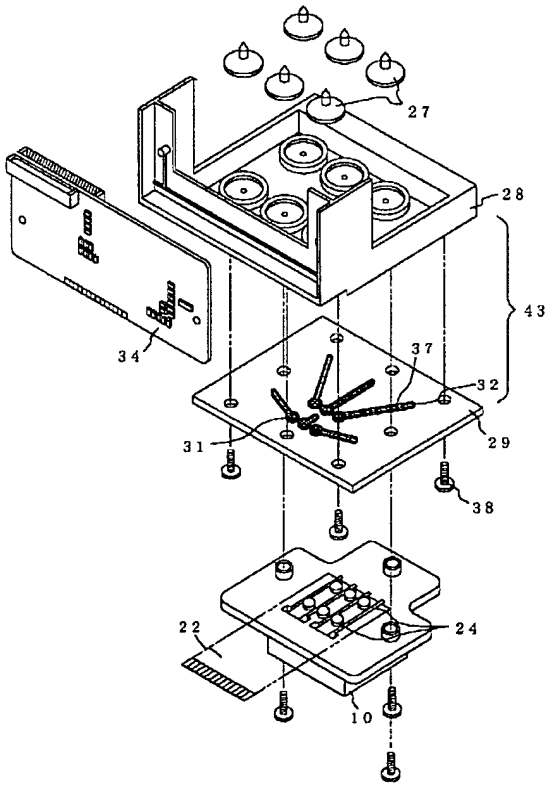

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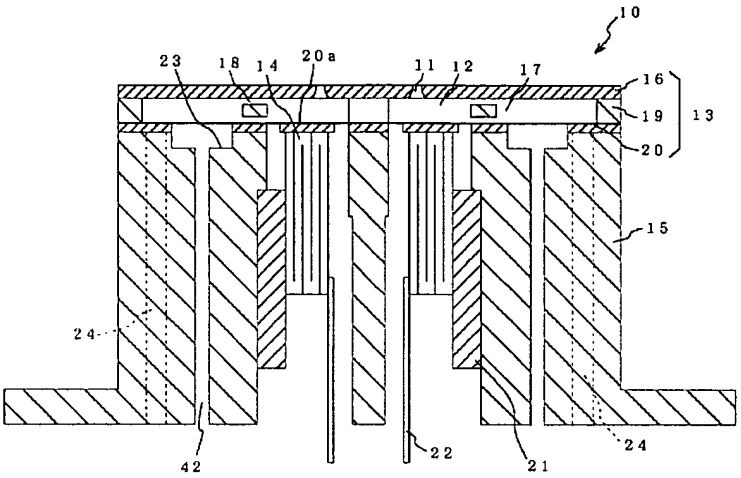
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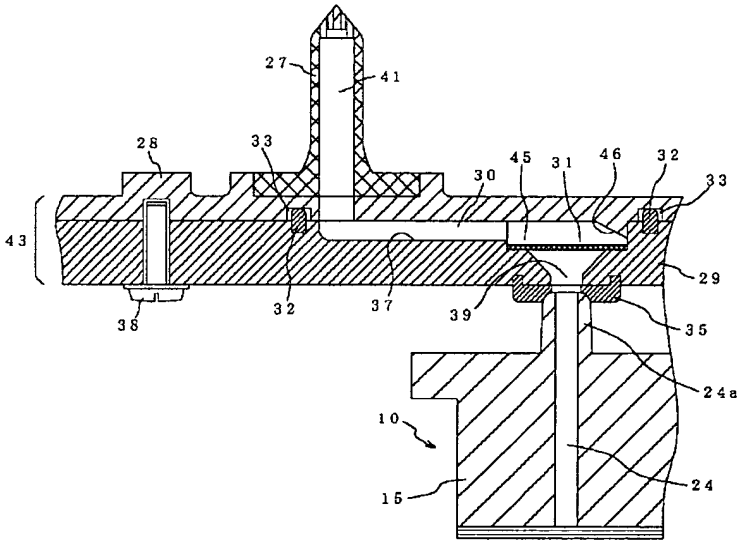
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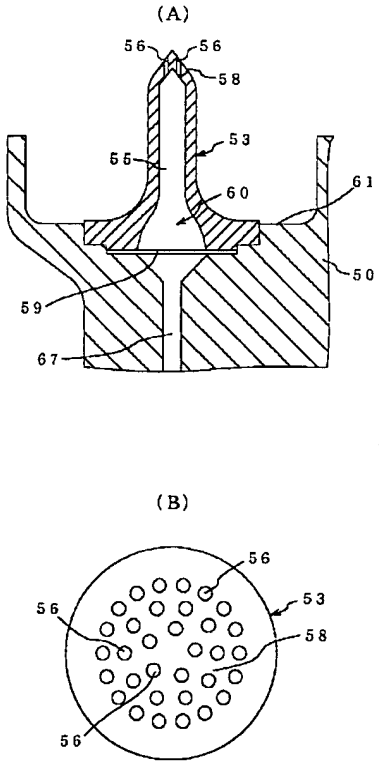
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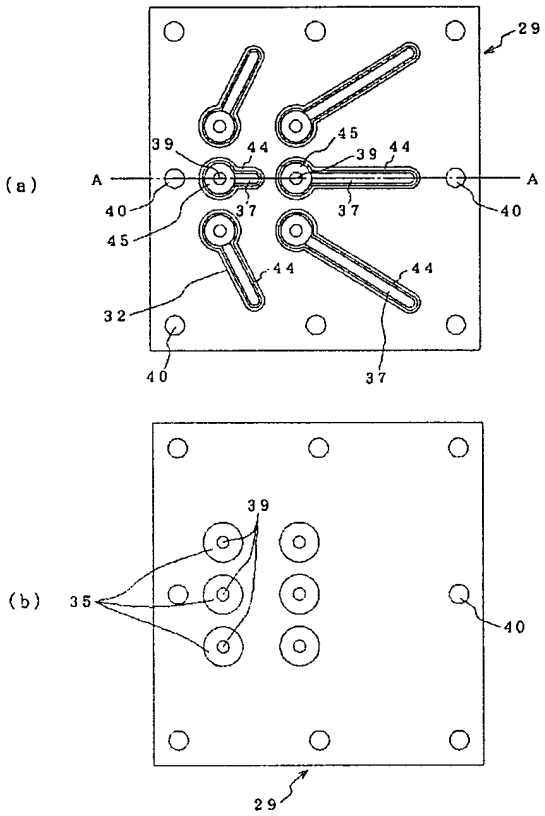
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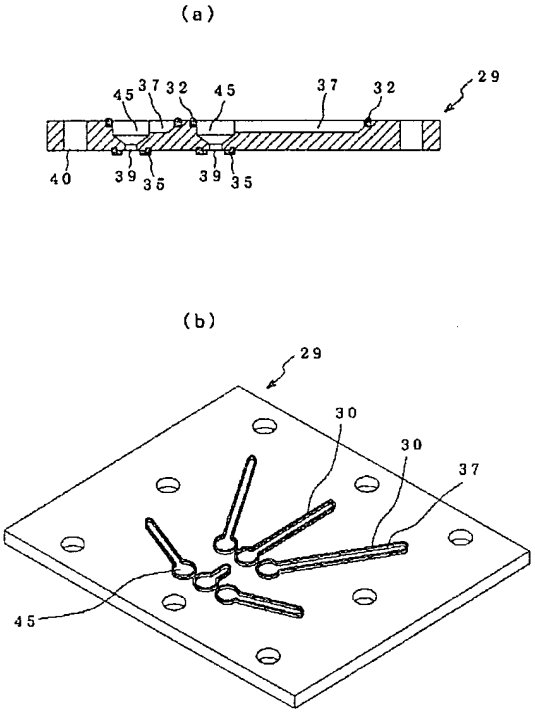
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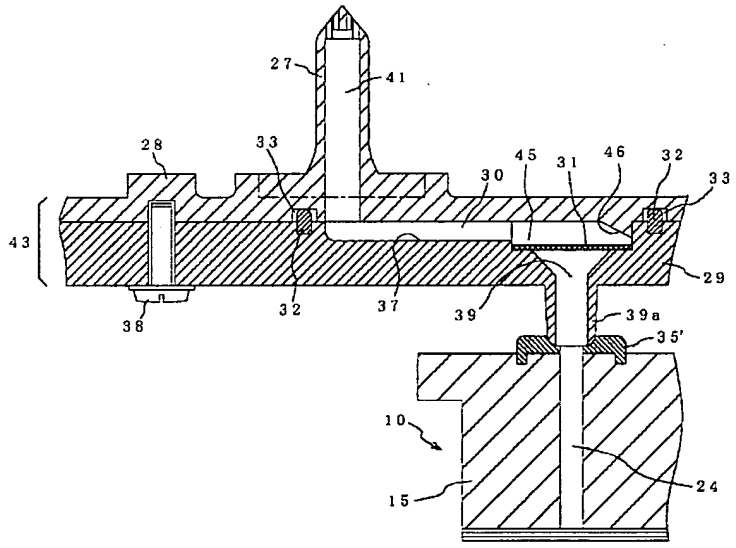
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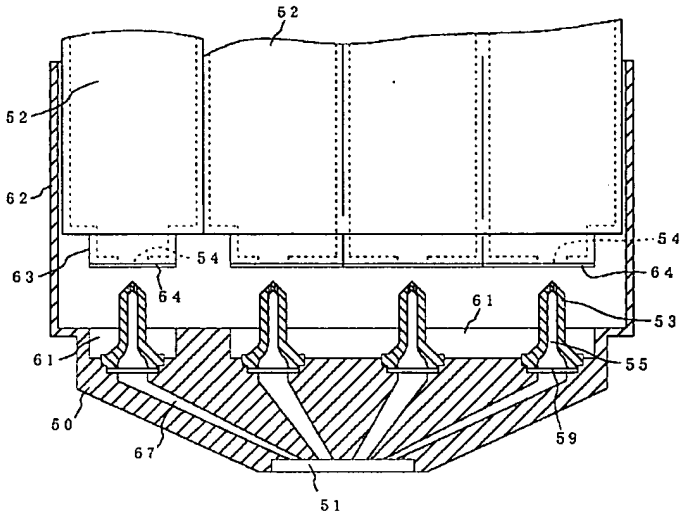
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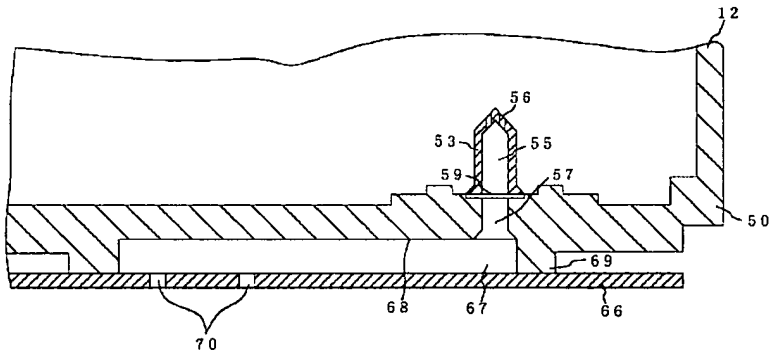
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